Buncombe County, North Carolina

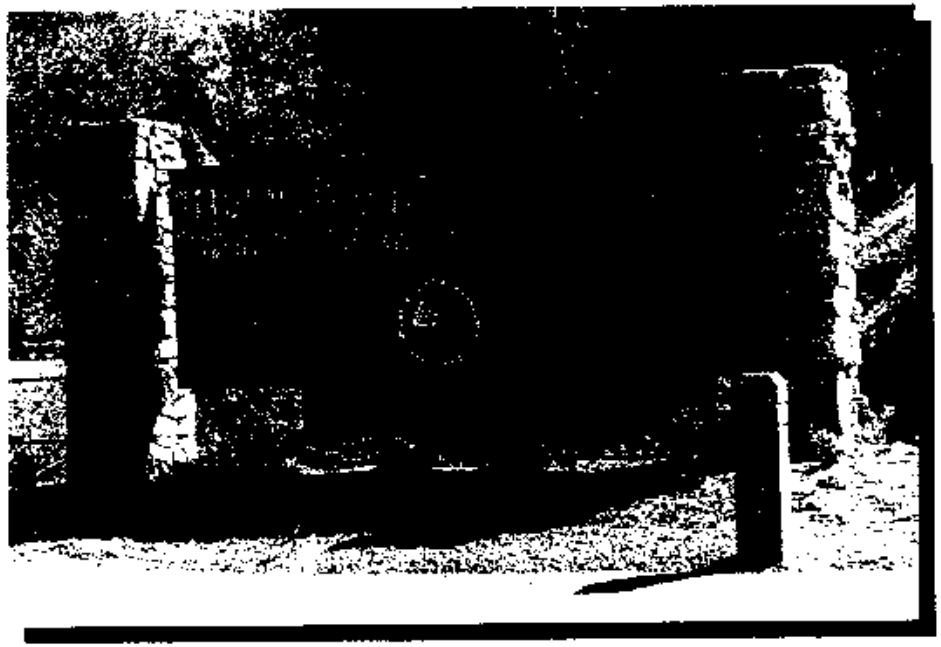
Subtitle D Landfill "Bioreactor" Project Proposal for USEPA Project XL

EPA United States Environmental Protection Agency

Presented

February 9, 2000

Project XL



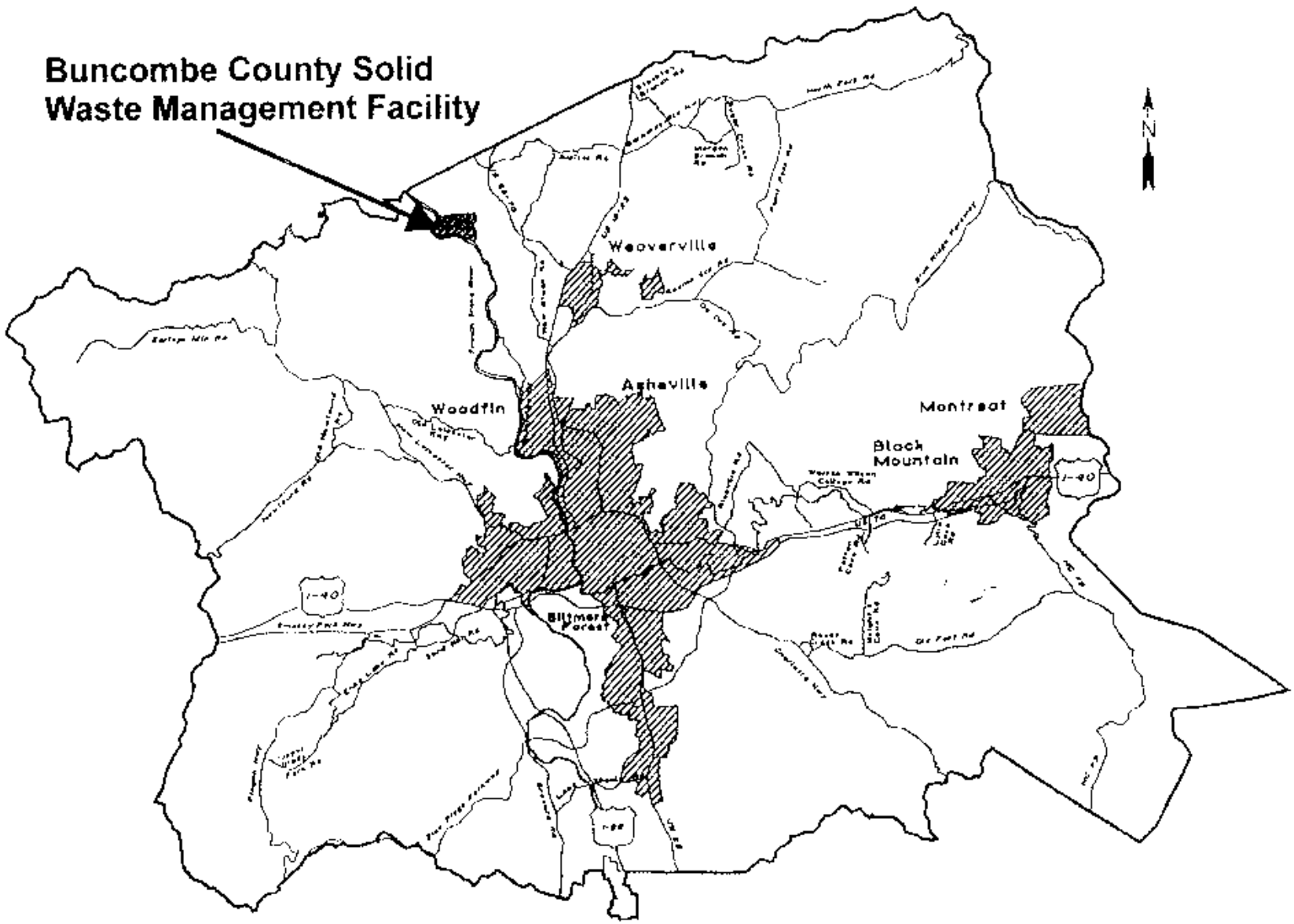
1999 SWANA North America Bronze Award Winner
Landfill Category

Buncombe County Project Team

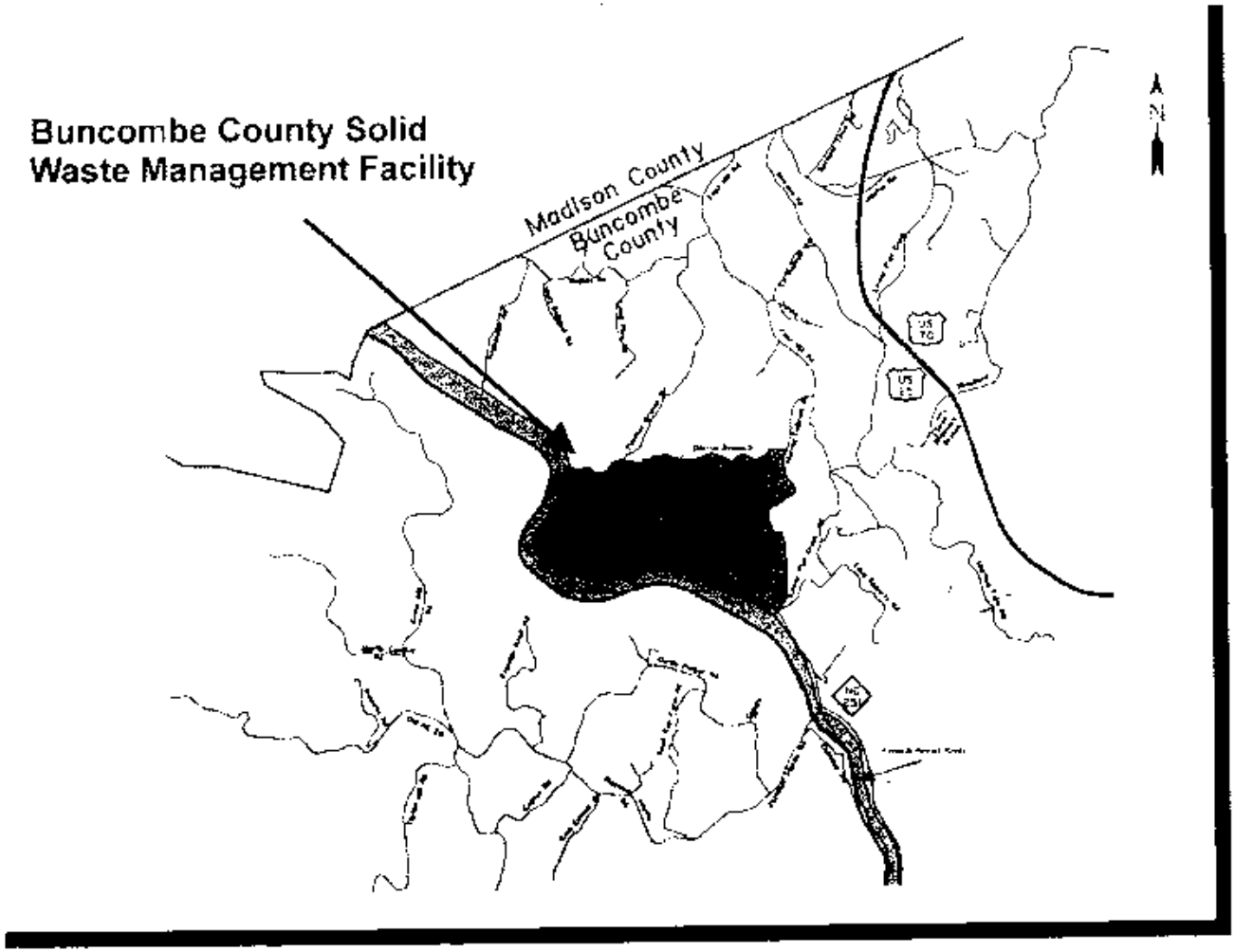
- Buncombe County
  - Bob Hunter - Director, General Svc. Dept.
  - Jon Creighton - Assistant County Manager
  - Sonny Hollifield - General Services Dept.
- Camp Dresser & McKee
  - Joe Wiseman - Project Manager
  - Tim Grant - Hydrogeologist
  - Chris Gabel - Landfill Design Engineer


Buncombe
County

Buncombe County Solid Waste Management Facility Site Location Map



Site Location Map



Buncombe County Statistics

- Current Population 195,000
- Landfill Receives About 150,000 tpy of MSW and C&D Waste
- Award Winning Solid Waste Program
  - 1999 NC SWANA Gold Award for Outstanding Integrated SW Program
  - 1999 SWANA Bronze Award in North American Landfill Competition
  - 2000 NC ACC Award for Haz Waste Program
  - 1998 NC CEC Design Excellence Award
- Bioreactor Project Identified as a Top County Priority

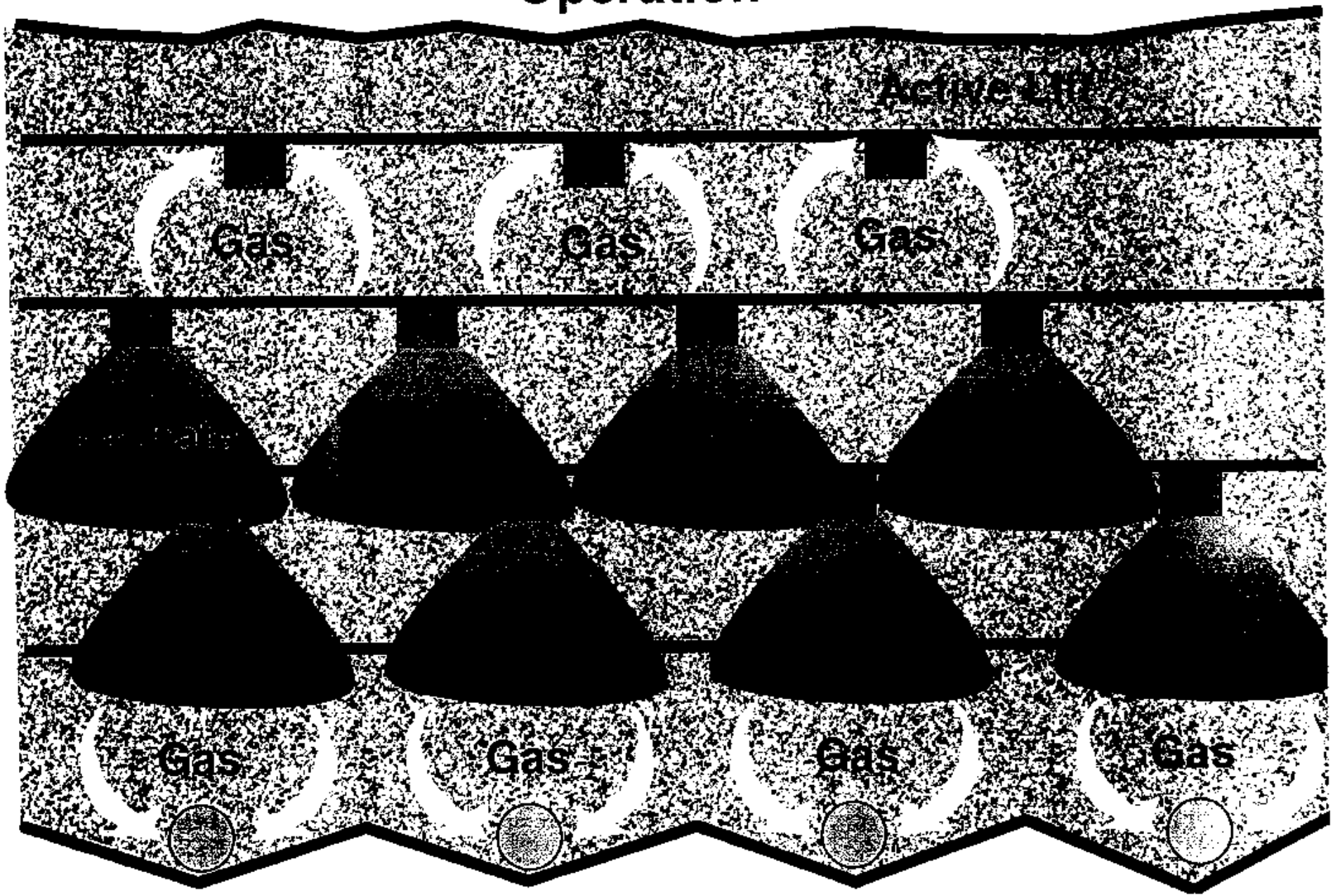
Project Description

- Combined Leachate Recirculation and Gas Collection
- Horizontal Trenches
- Pressure Injection System
- Active Gas Collection
- Alternative Liner

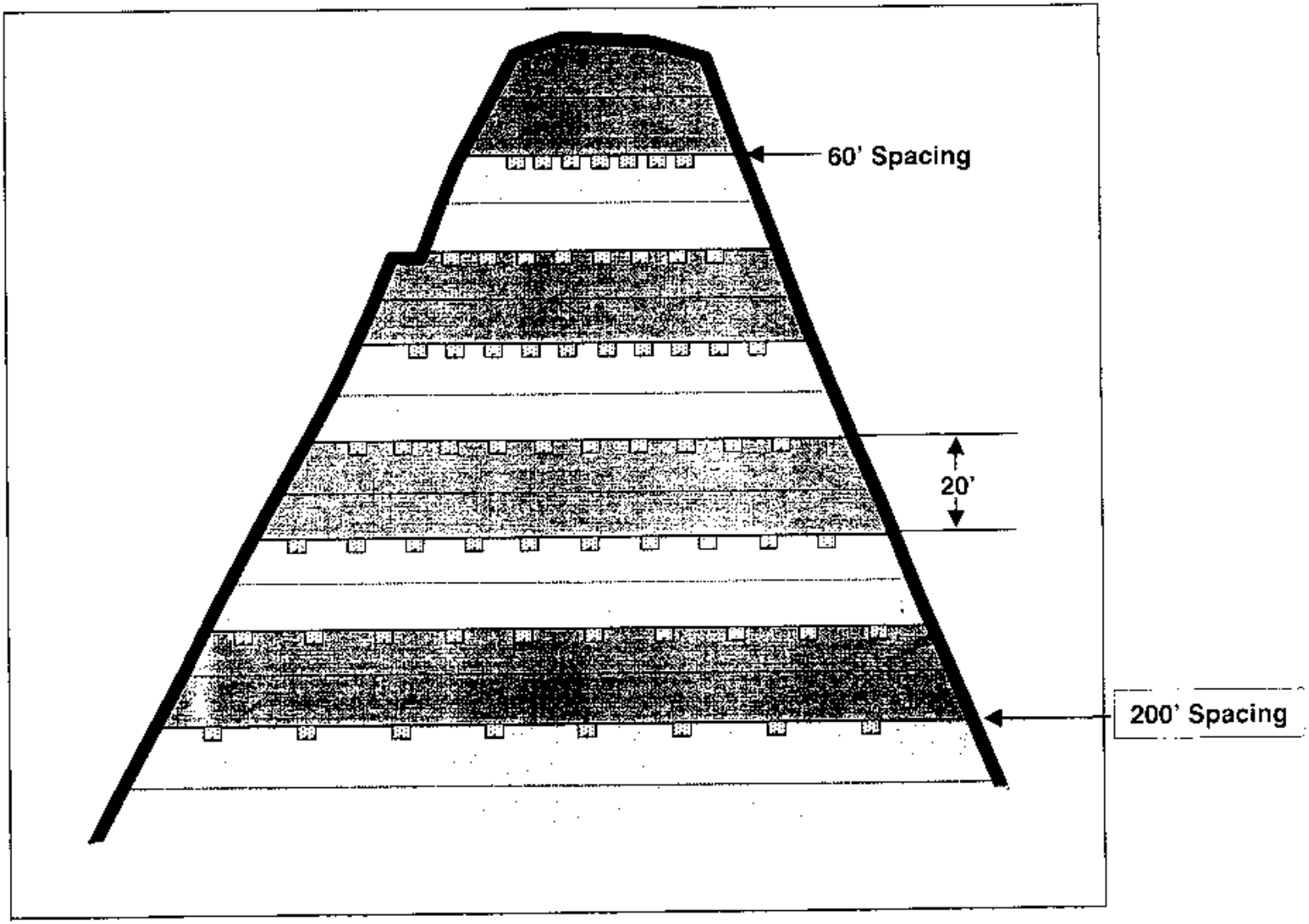
Requested Flexibility

- Allow Recirculation Over an Alternative Liner System

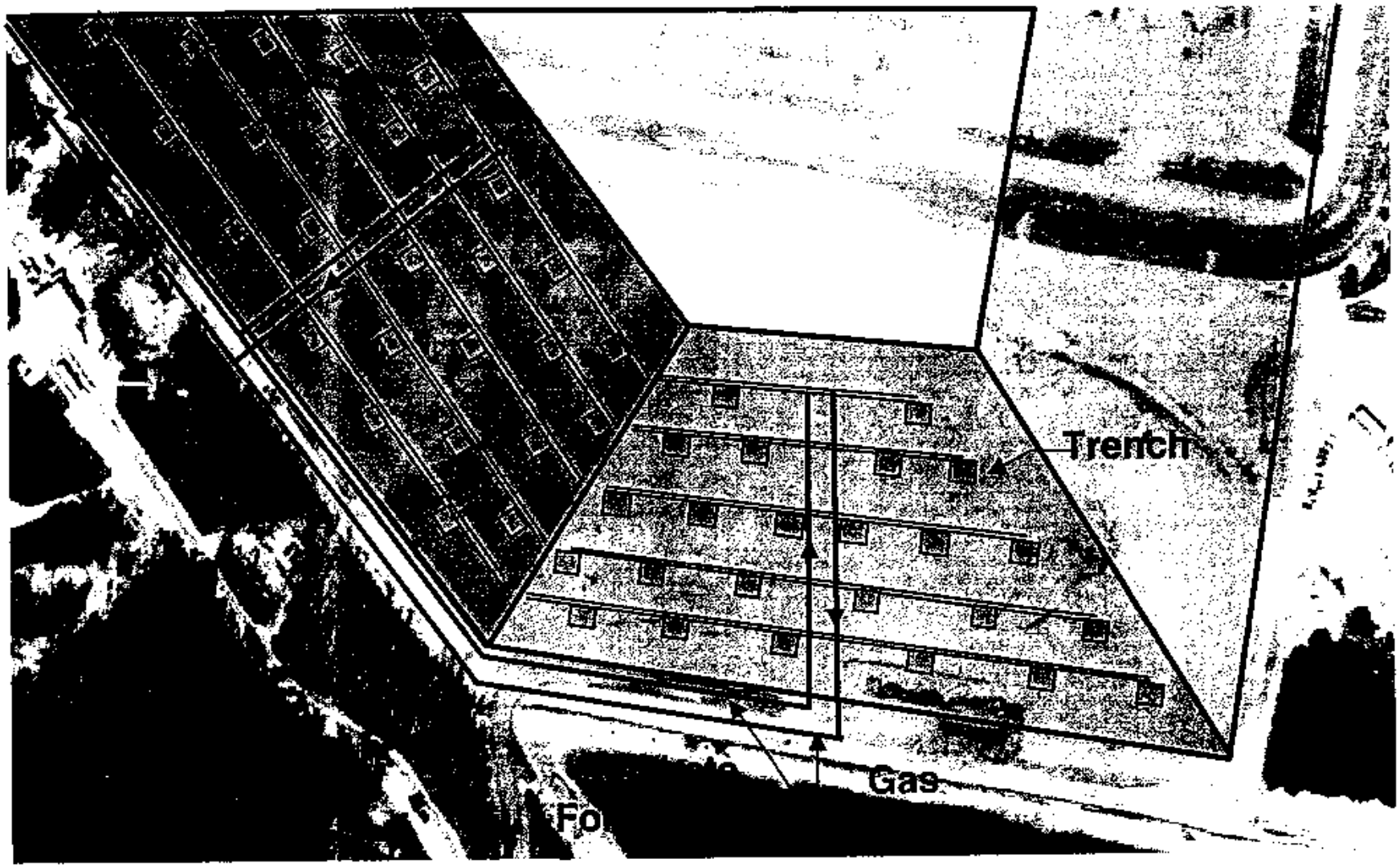
Combined Recirculation/Gas Collection Operation



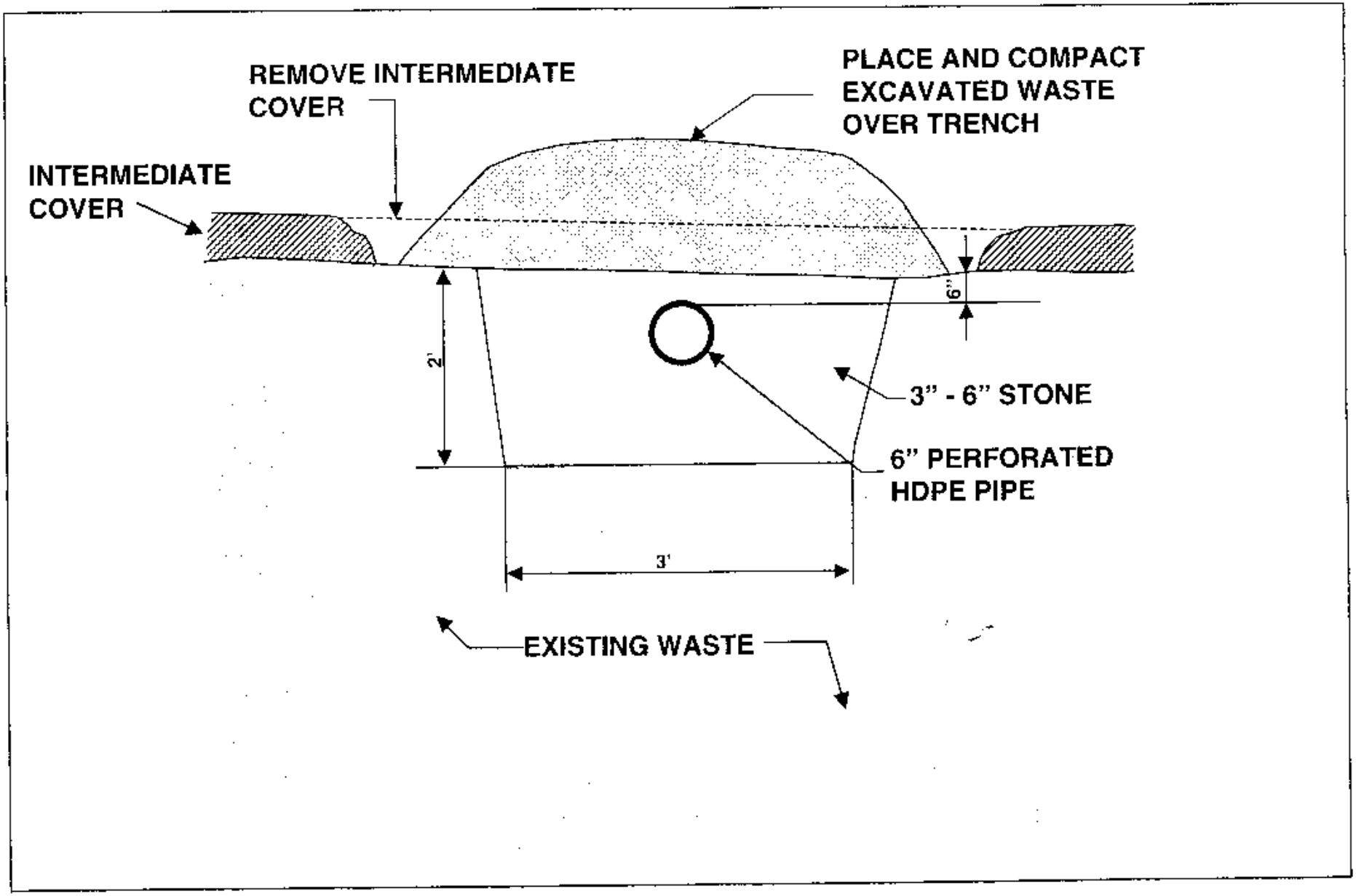
Trench Placement



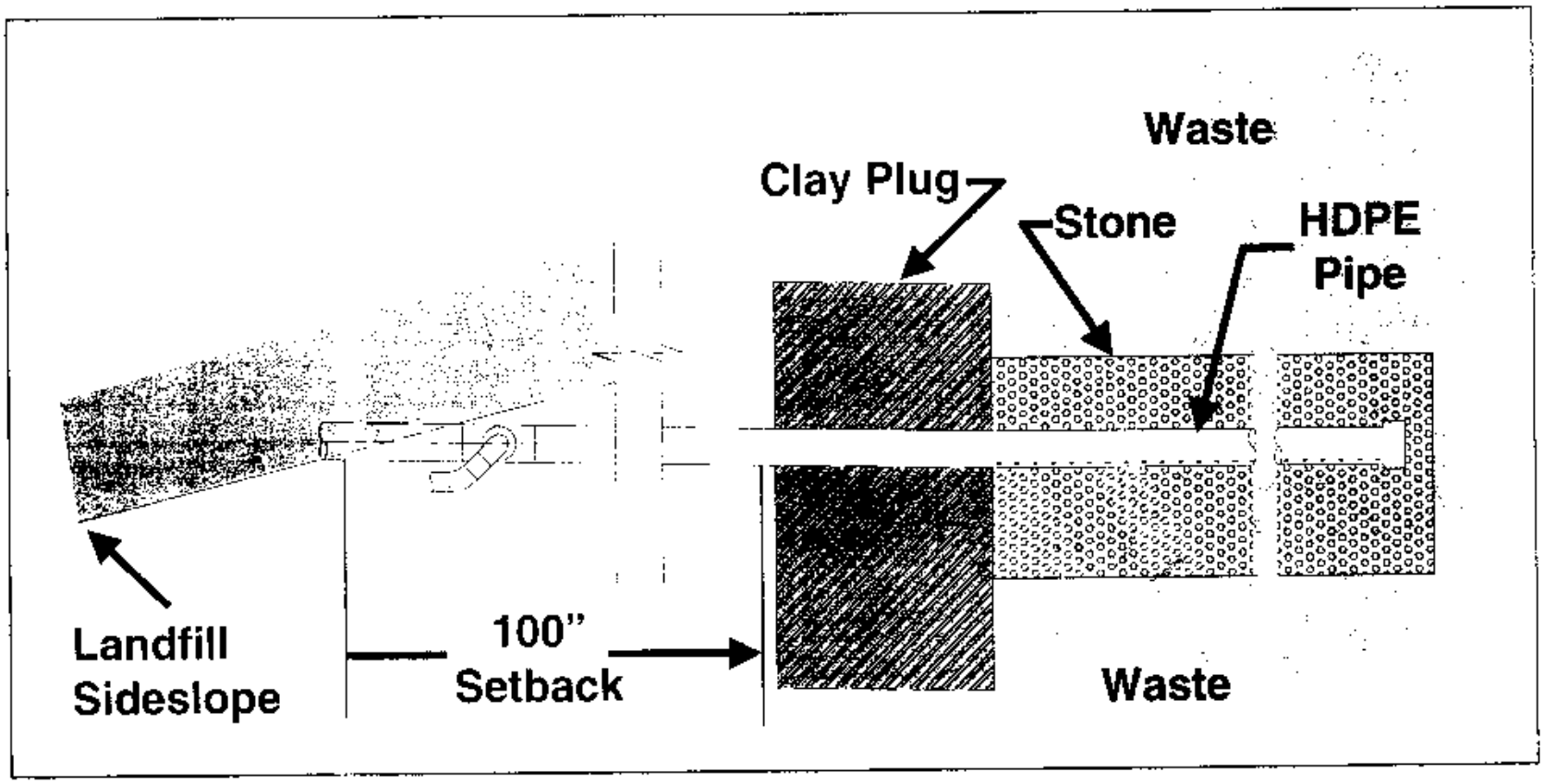
Distribution Piping



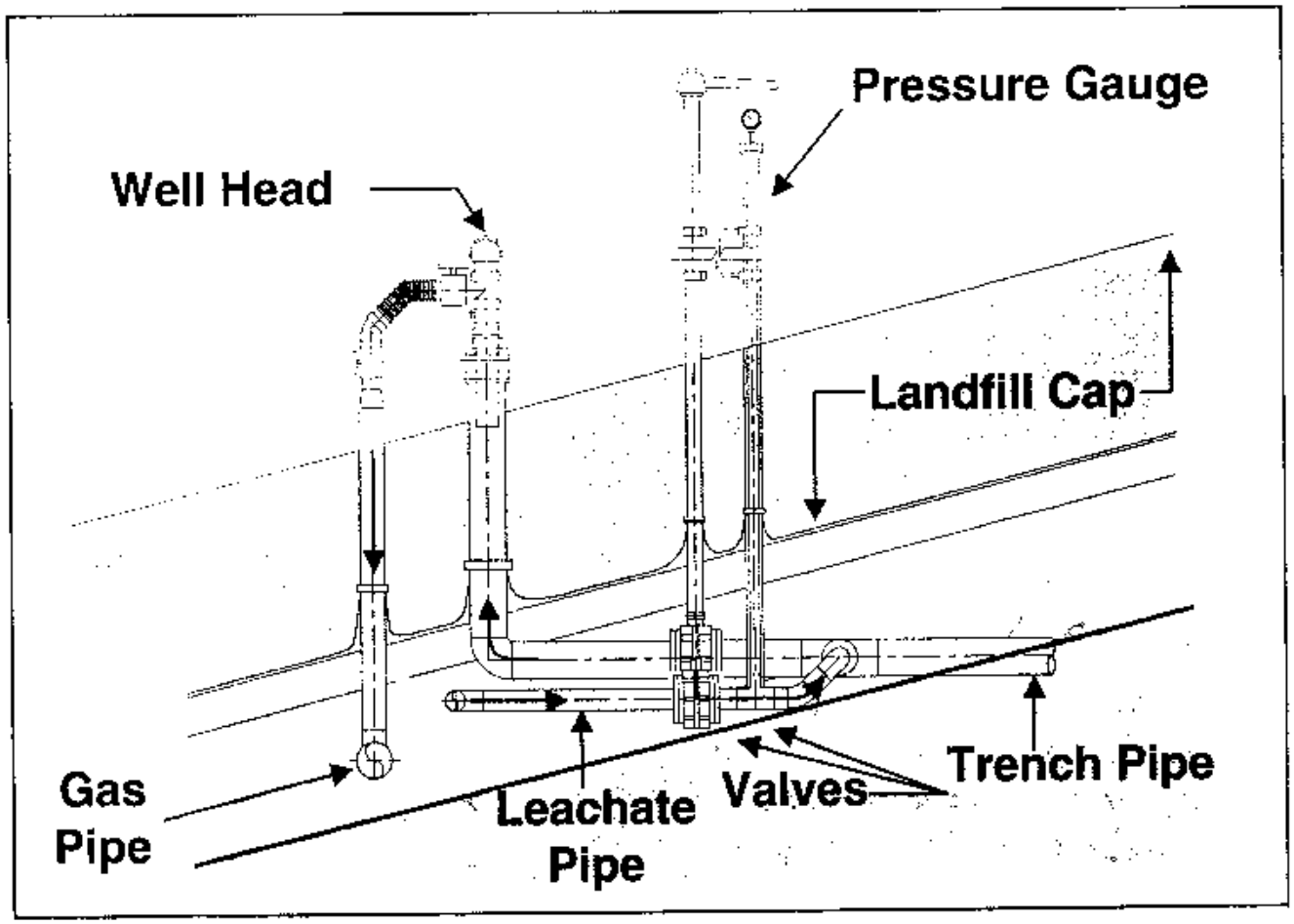
Trench Construction



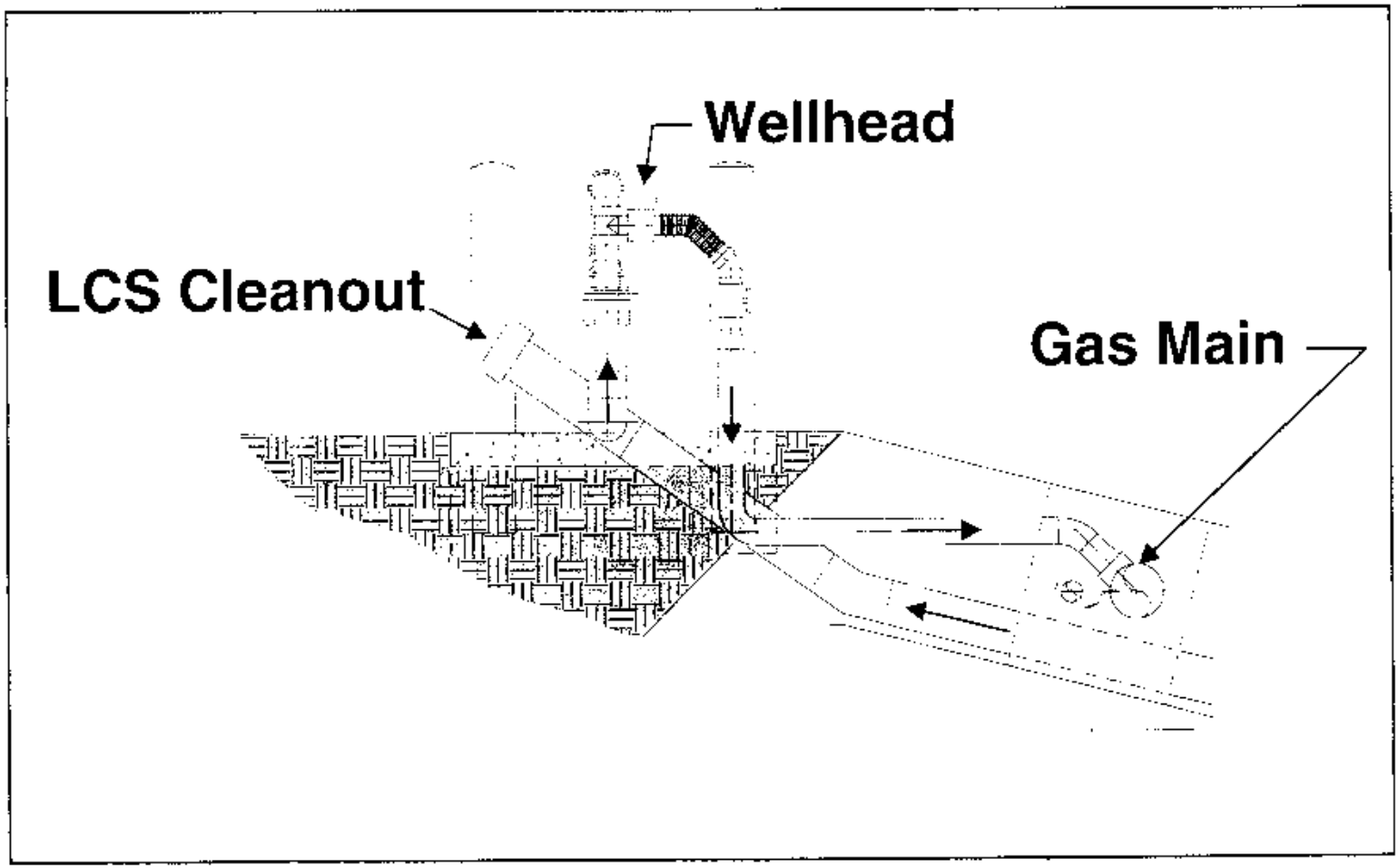
Trench Construction



Piping Connection to Trench



Gas Collection System Connection to LCS Cleanout



Horizontal Trenches and Pressure Injection

- Contained System
  - No Exposure to Operators
  - Avoid Contamination of Storm Runoff
  - Not Dependent on Weather
- No Interference with Disposal Operation
  - More Even Compaction
  - Greater Flexibility for Trench Layout
  - Less Prone to Damage
- More Thorough Wetting of Waste
  - Tighter Spacing
  - Better Lateral Dispersion
  - Less Prone to Clogging
- Gas Collection
  - Active During Operation
  - Odor Control

Project XL Criteria

- Superior Environmental Performance
- Flexibility and Other Benefits
- Stakeholder Involvement
- Innovation or Pollution Prevention
- Transferability
- Feasibility
- Evaluation, Monitoring, and Accountability
- Shifting of Risk Burden

Superior Environmental Performance

Accelerated Decomposition of Waste will:

- **Maximize Protection to Groundwater**
  1. **Quickly Stabilize Leachate**
  2. **Prevent "Dry Tomb" Scenario**
- **Shortens LFG Generation Period**
  1. **Increased Energy Potential**
  2. **Better LFG Control**

Alternative Liner will:

- **Decrease Leakage Potential**
- **Improve Constructibility**

Flexibility and Other Benefits

- System can be used for Recirculation, Gas Collection, or Both
- Gas Collection Operation is more Flexible
- Cost Savings
  1. Installation of Trenches by LF Staff
  2. Avoid Importing/Augmenting Clay
  3. Additional Capacity Through Settlement and Mining

Stakeholder Involvement

- North Carolina Department of Environment and Natural Resources
- Buncombe County Environmental Affairs Board
- Neighborhood Citizens

Innovation or Pollution Preventions

- Stabilization of Waste and Leachate
- Recovery of Landfill Gas
  1. Early Startup
  2. Combined Systems

Transferability

- Applicable at any MSW Landfill Facility
- Can be installed by onsite Staff
- Costs are offset by Benefits

Feasibility

- Self Funded
- Bioreactor Experience
- State Regulatory Approval

Evaluation, Monitoring and Accountability

- Monitor Leachate Quality
- Survey Settlement Plates
- Measure Recirculation Quantities
- Monitor Leak Detection Sump

Shifting of Risk Burden

- Contained System Protects Operators
- Faster Waste Decomposition
- Early Start-up of Gas Collection System
- No Head Buildup on Liner System

Site Investigation Methods

- 137 borings and/or piezometers and 15 monitoring wells installed using hollow-stem augers, air rotary and core drilling methods
- Fracture Trace Analysis/Geologic Mapping
- Geophysical Surveys
  - VLF
  - Seismic Refraction
- 2 Aquifer Performance Tests along with numerous slug tests

Site Geology/Hydrogeology

- Underlain by northeast sequence of migmatitic biotite hornblende gneiss
- Groundwater generally occurs within fractures except in lower elevations
- Groundwater flow is controlled by those areas of higher fracture density found in the drainage features

Groundwater Monitoring Network

- 17 monitoring wells will be located around Cells 1 - 5
- Nested wells are located in preferential flow pathways downgradient of each cell.
- Alternate monitoring system underlies sump area of each cell

Other Issues

- Location of Nearby Residents/Wells
- Demographic/Economic Data
- Other receptors - e.g., wetlands, streams, etc.....